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International Application No. PCT/DK 00/00355

International Filing Date 30 JUNE 2000

Name of receiving Office: Danish Patent and Trademark Office PCT-International Application PCT International Application

Applicant's or agent's file reference (if desired) (12 characters maximum) IPB/27065

# REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

**Box No. I TITLE OF INVENTION**

*A HANDHELD PIEZOELECTRIC ACUPUNCTURE STIMULATOR*

**Box No. II APPLICANT**

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

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This person is applicant for the purposes of: [X] all designated States [ ] all designated States except the United States of America [ ] the United States of America only [ ] the States indicated in the Supplemental Box

**Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)**

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:

[ ] applicant only

[ ] applicant and inventor

[ ] inventor only *(If this check-box is marked, do not fill in below.)*

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[ ] Further applicants and/or (further) inventors are indicated on a continuation sheet.

**Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: [X] agent [ ] common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

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Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked)*:

Regional Patent

- [X] AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
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- [X] AE United Arab Emirates
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- [X] AM Armenia .....
- [X] AT Austria ..... and Utility Model .....
- [X] AU Australia .....
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- [X] MK The former Yugoslav Republic of Macedonia ...
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Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

- [X] DZ Algeria .....
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Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)*

PCT/DK 00/00355
RO/DK 19 JULY 2000

**Box No. VI PRIORITY CLAIM** ☐ Further priority claim indicated in the Supplemental Box.

| Filing date of earlier application (day/month/year) | Number of earlier application | Where earlier application is: national application: country | regional application:* regional Office | international application: receiving Office |
|---|---|---|---|---|
| item (1) (02 July 1999) 02.07.1999 | BA 1999 00251 | Denmark | | |
| item (2) | | | | |
| item (3) | | | | |

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s): _____

** Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.*

**Box No. VII INTERNATIONAL SEARCHING AUTHORITY**

**Choice of International Searching Authority (ISA)** *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):*
ISA/ SE

**Request to use results of earlier search; reference to that search** *(if an earlier search has been carried out by or requested from the International Searching Authority):*
Date *(day/month/year)* Number Country *(or regional Office)*

**Box No. VIII CHECK LIST; LANGUAGE OF FILING**

This international application contains the following **number of sheets:**

| | | |
|---|---|---|
| request | : | 3 |
| description (excluding sequence listing part) | : | 5 |
| claims | : | 2 |
| abstract | : | 1 |
| drawings | : | 2 |
| sequence listing part of description | : | |
| **Total number of sheets** | : | 13 |

This international application is accompanied by the item(s) marked below:

1. ☒ fee calculation sheet and separate cheque
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☐ other *(specify)*:

**Figure of the drawings which should accompany the abstract:** 2

**Language of filing of the international application:** Danish

**Box No. IX SIGNATURE OF APPLICANT OR AGENT**

*Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).*

NØDSKOV, Preben

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1. Date of actual receipt of the purported international application: RO/DK 30 JUNE 2000 (30.06.2000)
2. Drawings: ☐ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:
4. Date of timely receipt of the required corrections under PCT Article 11(2):
5. International Searching Authority (if two or more are competent): ISA/SE
6. ☐ Transmittal of search copy delayed until search fee is paid.

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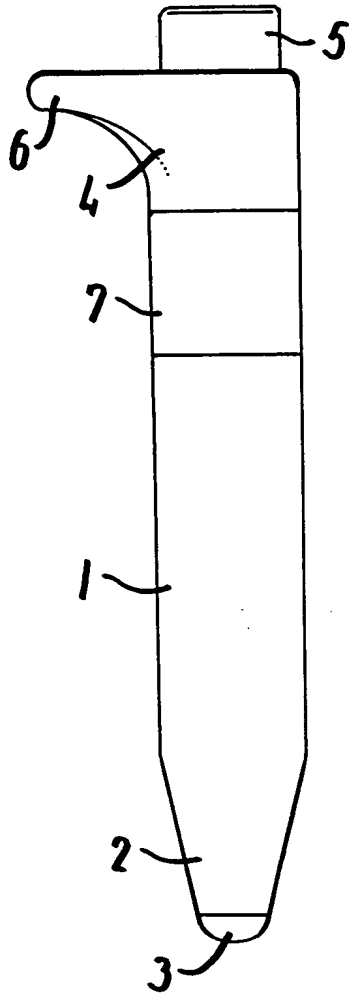


FIG.1

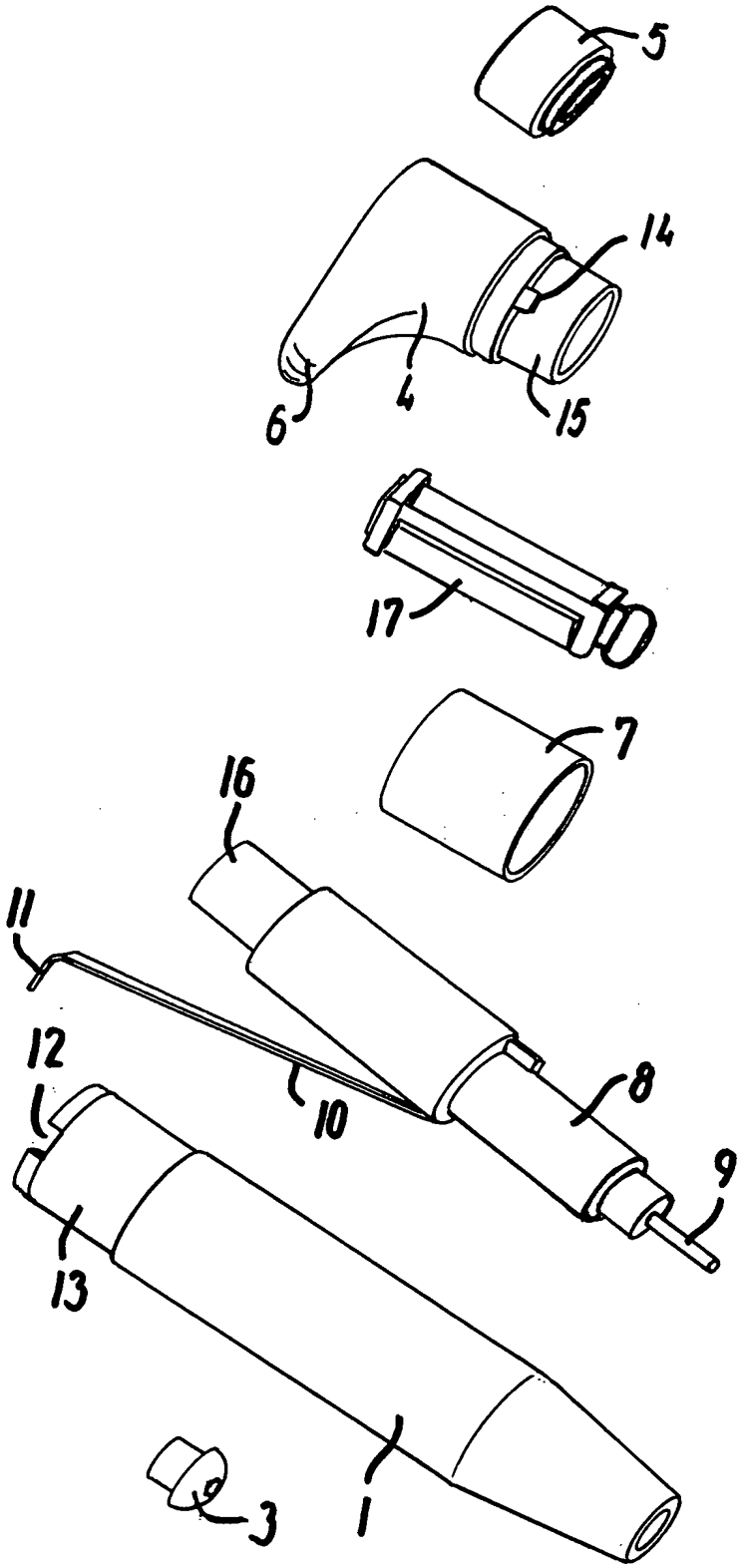


FIG.2

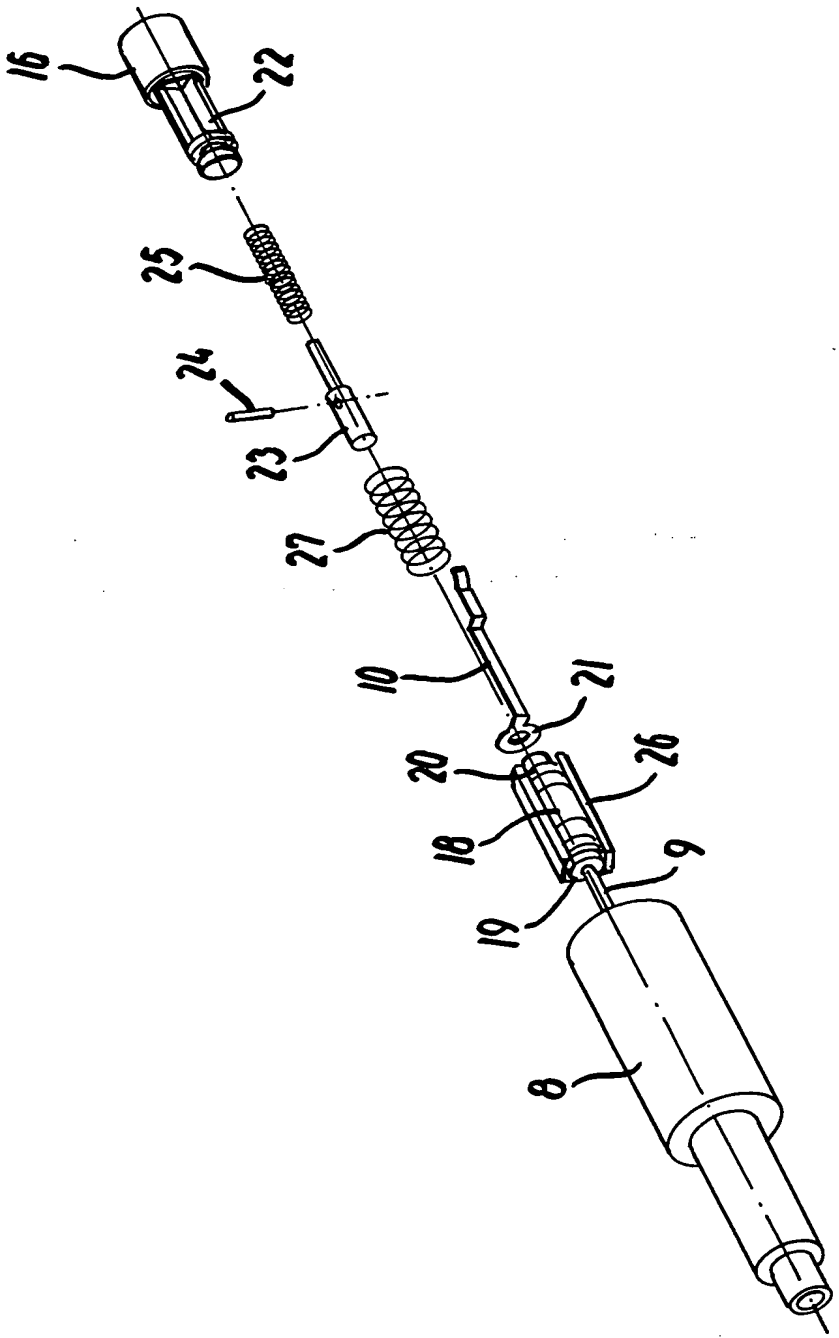


FIG. 3

# Håndholdt piezoelektrisk akupunkturstimulator.

Nærværende opfindelse angår en håndholdt piezoelektrisk akupunkturstimulator med et penlignende hovedsageligt elektrisk isolerende yderhylster, i hvis ene ende der er monteret en aktiveringstrykknap, medens den anden ende er udformet med en fra en til hudanlæg ud for en akupunkturzone bestemt endeflade tilbagetrukket kontaktstift, som er forbundet med en første elektrode for en piezoelektrisk omsætter, hvis anden elektrode dels er i elektrisk forbindelse med en i yderhylsteret anbragt håndkontakt, dels ved hjælp af en af aktiveringstryknappen påvirket, fjederbelastet slaghammer kan påvirkes mekanisk til frembringelse af en højspændt elektrisk smertelindringsimpuls med lavt energiindhold.

Fra DE-A1-40 26 820 kendes en akupunkturstimulator af denne type, hvor den piezoelektriske omsætter og en med dennes første elektrode forbundet, forholdsvis lang kontakt stift er anbragt i hver sit elektrisk isolerende hylster, omgivet henholdsvis af et elektrisk ledende metallisk yderhylster og et ligeledes metallisk behandlingshoved med den til hudanlæg udformede endeflade. Slaghammeren med tilhørende aktiveringstrykfjeder er optaget i en boring i den forholdsvis langstrakte aktiveringstryknap, medens returfjederen er anbragt mellem aftrappede skulderflader på aktiveringstrykknappen og et mellem denne og det isolerende hylster omkring den piezoelektriske omsætter anbragt mellemstykke.

Det betydelige antal. til dels ret små enkeltkomponenter i denne kendte stimulator komplicerer fremstillingen og monteringen, og udformningen med elektriske ledende yderhylster og behandlingshoved medfører en mindre tilfredsstillende elektrisk iso-

lering af den piezoelektriske omsætters højspændingselektrode og kan forringe stimulatorens effektivitet.

Ved opfindelsen afhjælpes disse ulemper gennem en udformning af en stimulator af den angivne art, som er ejendommelig ved, at den piezoelektriske omsætter sammen med nævnte første og anden elektrode og nævnte slaghammer med tilhørende fjedersystem omfattende en aktiveringstrykfjeder og en returfjeder er monteret i et fælles elektrisk isolerende inderhylster, der er udformet til formbindende montering i yderhylsteret med nævnte kontaktstift fastholdt med forholdsvis kort udragende længde i den ene af inderhylsteret, i hvis anden ende der er monteret en længdeforskydelig slaghammeraktivator, som er i mekanisk forbindelse med aktiveringstrykknappen, hvorved den elektriske forbindelse mellem den piezoelektriske omsætters anden elektrode og nævnte håndkontakt omfatter en bladfjederkontakt, som er ført ud gennem inderhylsteret og mellem dette og yderhylsteret til kontaktdannelse med den som kontaktring udformede håndkontakt.

Fortrinsvis er bladfjederkontakten med en ombukket endedel fikseret i en udskæring ved den frie kant af en som understøtning for kontaktringen tjenende endedel af yderhylsteret. herigennem kan på enkel måde ved dimensionering af bladfjederkontaktens ombukkede endedel opnås en nøjagtig fastlæggelse af gnistrækningen mellem enden af kontaktstiften og den til hudanlæg bestemte endedel af stimulatoren.

Idet den håndholdte stimulator er udformet til tommelfingerbetjening af aktiveringstrykknappen kan en nøjagtig placering af den ydre kontaktring til kontaktdannelse med brugerens pegefinger opnås ved,at aktiveringstrykknappen er monteret i et forlængelse af yderhylsteret og kontaktringen placeret topstykke med udragende anlæg til støtte mod brugerens pegefingerkno

i forbindelse med tommelfingerbetjening af aktiveringstrykknappen.

I det følgende forklares opfindelsen nærmere under henvisning til medfølgende afbildninger, hvor

fig. 1 og 2 viser en udformning af en piezoelektrisk akupunkturstimulator ifølge frembringelsen henholdsvis i monteret stand og et eksploderet billede af den hovedkomponenter, og

fig. 3 mere skematisk viser de i stimulatorens inderhylster monterede enkeltdele.

Set udefra omfatter den håndholdte, piezoelektriske akupunkturstimulator som vist i fig. 1 et elektrisk isolerende yderhylster 1 af et egnet plastmateriale, f.eks. nylon, med en hovedsageligt konisk endedel 2 i forbindelse med et til hudanlæg mod et akupunkturpunkt udformet behandlingshoved 3.

I den modsatte ende er i forlængelse af yderhylsteret 1 anbragt et ligeledes elektriske isolerende topstykke 4, hvori er monteret en aktiveringstrykknap 5. Idet stimulatoren er udformet til tommelfingerbetjening af aktiveringstrykknappen 5 er topstykket 4 udformet med et udragende anlæg 6, som under brugen placeres i anlæg mod pegefingerknoen og derved placerer en mellem topstykket 4 og yderhylsteret 1 anbragt kontaktring 7 i anlæg mod brugerens pegefinger.

Stimulatorens aktive komponenter, som forklares nedenfor under henvisning til fig. 3, er ifølge frembringelsen som vist i fig. 2 monteret i et elektrisk isolerende inderhylster 8, fra hvis ene ende den til overføring af de af stimulatoren frembragte smertelindringsimpulser ved gnistdannelse udformede kontaktstift 9 rager ud med forholdsvis kort længde.

Inderhylsteret 8 er udformet til formbindende montering i yderhylsteret 1 med enden af kontaktstiften 9 trukket en smule tilbage fra det af behandlings-

hopvedet 3 dannede hudanlæg til fastlæggelse af en veldefineret gniststrækning.

Som ligeledes vist i fig. 2 er den elektriske forbindelse mellem stimulatorens jordelektrode og kontaktringen 7 etableret ved hjælp af en bladfjederkontakt 10, som er ført ud gennem inderhylsteret 8 og strækker sig mellem dette og yderhylsteret 1. Bladfjederkontakten 10 er afsluttet med en ombukket endedel 11, som til fiksering af inderhylsteret 8's placering i yderhylsteret 1 bringes i indgreb med en udskæring 12 ved kanten af en som understøtning for kontaktringen 7 udformet endedel 13 af yderhylsteret 1. Den ombukkede endedel 11 af bladfjederkontakten 10 fastholdes i udskæringen 12 ved hjælp af en fremspringende knast 14 på en til indskydning i endedelen 13 udformet endedel 15 på topstykket 4.

Ved den modsatte ende af inderhylsteret 8 i forhold til kontaktstiften 9 er monteret en længdeforskydelig aktivator 16 til den mekaniske påvirkning af den piezoelektriske omsætter. I den monterede tilstand påvirkes aktivatoren 16 af aktiveringstrykknappen 5 via en profileret trykstav 17, som er monteret i topstykket 4.

Stimulatorens aktive komponenter, som er monteret i inderhylsteret 8 omfatter som vist i fig. 3 både den piezoelektriske omsætter 18 med en første elektrode 19 i forbindelse med den fra inderhylsteret 8's ene ende udragende trykstift 9 og en anden elektrode 20 i elektrisk forbindelse med en ved bladfjederkontakten 10's ene ende udformet kontaktring 21, og den til mekanisk påvirkning af omsætteren 18 udformede aktiveringsmekanisme omfattende den fra inderhylsteret 8's modsatte ende udragende, længdeforskydelige aktivator 16 med en føring 22 for en slaghammer 23 med en tværgående blokeringsstift 24 og en aktiveringstrykfjeder

25, samt en mellem føringen 22 og en holder 26 for omsætteren 18 anbragt returtrykfjeder 27.

Den mekaniske funktion af de i fig. 3 viste komponenter er i og for sig kendt og indebærer, at der ved en ved betjening af aktiveringstrykknappen 5 frembragt længdeforskydning af aktivatoren 18 i inderhylsteret 8 først sker en sammentrykning af aktiveringstrykfjederen 25, som herefter ved den af aktivatoren 16's bevægelse fremkaldte frigørelse af slaghammeren 23 med stor kraft skyder denne mod omsætteren 18's anden elektrode 20. Ved den herigennem forårsagede momentane komprimering af omsætteren 18 frembringes den elektriske smertelindringsimpuls med høj spænding og forholdsvis lavt energiindhold, f.eks ved 15.000 volt og 6 $\mu$A.

Den smertelindrende virkning af stimulatoren beror som i og for sig kendt på, at der ved gnistoverføring af den således frembragte impuls til et akupunkturpunkt ved det sted, som ønskes smertebehandlet antages at ske en aktivering af kroppens eget endorphine smertelindringssystem.

# P A T E N T K R A V

1. Håndholdt piezoelektrisk akupunkturstimulator med et penlignende hovedsageligt elektrisk isolerende yderhylster (1), i hvis ene ende der er monteret en aktiveringstrykknap (5), medens den anden ende er udformet med en fra en til hudanlæg ud for en akupunkturzone bestemt endeflade (3) tilbagetrukket kontaktstift (9), som er forbundet med en første elektrode (19) for en piezoelektrisk omsætter (18), hvis anden elektrode (20) dels er i elektrisk forbindelse med en ved yderhylsteret (1) anbragt håndkontakt (7), dels ved hjælp af en af aktiveringstryknappen (5) påvirket, fjederbelastet slaghammer (23) kan påvirkes mekanisk til frembringelse af en højspændt elektrisk smertelindringsimpuls med lavt energiindhold, k e n d e t e g n e t ved, at den piezoelektriske omsætter (18) sammen med nævnte første og anden elektrode (19, 20) og nævnte slaghammer (23) med tilhørende fjedersystem omfattende en aktiveringstrykfjeder (25) og en returfjeder (27) er monteret i et fælles elektrisk isolerende inderhylster (8), der er udformet til formbindende montering i yderhylsteret (1) med nævnte kontaktstift (9) fastholdt med forholdsvis kort udragende længde i den ene af inderhylsteret (8), i hvis anden ende der er monteret en længdeforskydelig slaghammeraktivator (16), som er i mekanisk forbindelse med aktiveringstrykknappen (5), hvorved den elektriske forbindelse mellem den piezoelektriske omsætters (18) anden elektrode (20) og nævnte håndkontakt (7) omfatter en bladfjederkontakt (10), som er ført ud gennem inderhylsteret (8) og mellem dette og yderhylsteret (1) til kontaktdannelse med den som kontaktring udformede håndkontakt (7).

2. Akupunkturstimulator ifølge krav 1, k e n d e

t e g n e t ved, at bladfjederkontakten (10) med en ombukket endedel (11) er fikseret i en udskæring (12) ved den frie kant af en som understøtning for kontaktringen (7) tjenende endedel (13) af yderhylsteret (1).

3. Akupunkturstimulator ifølge krav 1 eller 2, k e n d e t e g n e t ved, at aktiveringstrykknappen (5) er monteret i et i forlængelse af yderhylsteret (1) og kontaktringen (7) placeret topstykke (4) med udragende anlæg (6) til støtte mod brugerens pegefingerkno i forbindelse med tommelfingerbetjening af aktiveringstrykknappen (5).

Håndholdt piezoelektrisk akupunkturstimulator.

S A M M E N D R A G

I en håndholdt piezoelektrisk akupunkturstimulator med et penlignende hovedsageligt elektrisk isolerende yderhylster (1), i hvis ene ende der er monteret en aktiveringstrykknap (5), medens den anden ende er udformet med en kontaktstift (9), som er forbundet med en første elektrode for en piezoelektrisk omsætter, som ved hjælp af en af aktiveringstryknappen (5) påvirket, fjederbelastet slaghammer kan påvirkes mekanisk til frembringelse af en højspændt elektrisk smertelindringsimpuls med lavt energiindhold, er den piezoelektriske omsætter med tilhørende elektroder og nævnte slaghammer med tilhørende fjedersystem monteret i et fælles elektrisk isolerende inderhylster (8) udformet til formbindende montering i yderhylsteret (1), hvorved den elektriske forbindelse mellem den piezoelektriske omsætters anden elektrode og en kontaktring (7) ved yderhylsteret omfatter en bladfjederkontakt (10), som er ført ud gennem inderhylsteret (8) og mellem dette og yderhylsteret (1).

(Fig. 2)

PATENT COOPERATION TREATY

# PCT



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70) 14

| Applicant's or agent's file reference | FOR FURTHER ACTION | See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |
|---|---|---|
| IPB/27065 | | |
| International application No. | International filing date *(day/month/year)* | Priority date *(day/month/year)* |
| PCT/DK00/00355 | 30/06/2000 | 02/07/1999 |
| International Patent Classification (IPC) or national classification and IPC<br>A61H39/00 | | |
| Applicant<br>NODSKOV, Preben | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☒ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

| Date of submission of the demand | Date of completion of this report |
|---|---|
| 19/01/2001 | 11.04.2001 |
| Name and mailing address of the international preliminary examining authority:<br>European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465 | Authorized officer<br>Turmo Peruga, R<br>Telephone No. +49 89 2399 7471 |

Form PCT/IPEA/409 (cover sheet) (January 1994)

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/DK00/00355

## I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
**Description, pages:**

1-5 as originally filed

**Claims, No.:**

1-3 as originally filed

**Drawings, sheets:**

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|---|---|---|
| Novelty (N) | Yes: | Claims 1-3 |
| | No: | Claims |
| Inventive step (IS) | Yes: | Claims 1-3 |
| | No: | Claims |
| Industrial applicability (IA) | Yes: | Claims 1-3 |
| | No: | Claims |

2. Citations and explanations
**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
**see separate sheet**

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
**see separate sheet**

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. The document DE-4026820-A1 (D1) is regarded as the closest prior art to the subject-matter of claim 1.

2. The subject-matter of claim 1 appears to be novel in the sense of Article 33(2) PCT.
   Claim 1 defines an acupuncture stimulator which differs from the disclosure of D1 in that the exterior casing is electrically insulating, comprises a leaf spring contact and the hand contact is designed as a contact ring.

3. The subject-matter of claim 1 appears to be inventive in view of Article 33(3) PCT.
   The inventive features of claim 1 are the electrically insulating exterior casing and the hand contact designed as a contact ring.
   Reducing the contact surface between the user and the acupuncture device is considered as overcoming a technical prejudice, because the skilled practitioner would rather tend to augment this surface for better conductivity and better handling of the device.

4. Claims 2 and 3 refer to preferred embodiments of the subject-matter of claim 1. Therefore, they also fulfil the requirements of Articles 33(2) and 33(3) PCT.

5. The industrial applicability of claims 1-3 is self-evident (Article 33(4) PCT).

**Re Item VII**

**Certain defects in the international application**

6. The subject-matter of claim 1 is not properly delimited over document D1.

7. The reference number 18 in page 5, line 16, should have been replaced for 16 (Rule 11.13(m) PCT).

**Re Item VIII**

**Certain observations on the international application**

8. The relative term "comparatively short" used in claim 1 (line 24) has no well-recognised meaning and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the claim unclear (Article 6 PCT).

# PATENT COOPERATION TREATY

17 APR. 2

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

COPY

To:

INTERNATIONALT PATENT-BUREAU
23 Hoje Taastrup Boulevard
DK-2630 Taastrup
DANEMARK

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Rule 71.1)

| | |
|---|---|
| Date of mailing *(day/month/year)* | 11.04.2001 |
| Applicant's or agent's file reference<br>IPB/27065 | **IMPORTANT NOTIFICATION** |

| International application No. | International filing date *(day/month/year)* | Priority date *(day/month/year)* |
|---|---|---|
| PCT/DK00/00355 | 30/06/2000 | 02/07/1999 |

Applicant
NODSKOV, Preben

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

| Name and mailing address of the IPEA/ | Authorized officer |
|---|---|
| European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465 | Ertl, L<br><br>Tel.+49 89 2399-7447 |

Form PCT/IPEA/416 (July 1992)

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
11 January 2001 (11.01.2001)

PCT

(10) International Publication Number
WO 01/01920 A1

(51) International Patent Classification[7]: A61H 39/00

(21) International Application Number: PCT/DK00/00355

(22) International Filing Date: 30 June 2000 (30.06.2000)

(25) Filing Language: Danish

(26) Publication Language: English

(30) Priority Data:
BA 1999 00251 2 July 1999 (02.07.1999) DK

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(74) Agents: **RAFFNSØE, Knud, Rosenstand** et al.; Internationalt Patent-Bureau, 23 Høje Taastrup Boulevard, DK-2630 Taastrup (DK).

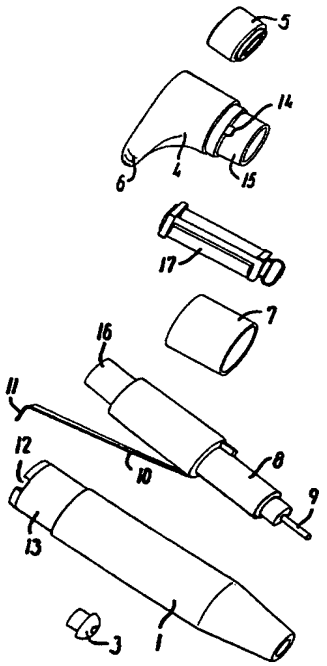
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

**Published:**
— *With international search report.*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: A HANDHELD PIEZOELECTRIC ACUPUNCTURE STIMULATOR




(57) Abstract: In a handheld piezoelectric acupuncture stimulator with a pen-like, substantially electrically insulating exterior casing (1), at one end of which an actuator button (5) is mounted, while the other end is provided with a contact pin (9), which is connected with a first electrode of a piezoelectric converter, which by means of a spring-loaded impact hammer actuated by the actuator button (5) may be mechanically operated for generation of a high voltage electric pain relieving pulse with a low energy content, the piezoelectric converter with associated electrodes and said impact hammer with associated spring system are mounted in a common electrically insulating interior casing (8) designed for form-fit mounting in the exterior casing (1), whereby the electric connection between the second electrode of the piezoelectric converter and a contact ring (7) on the exterior casing comprises a leaf spring contact (10), which projects through the interior casing (8) and extends between said interior casing and the exterior casing (1).

WO 01/01920 A1

# A HANDHELD PIEZOELECTRIC ACUPUNCTURE STIMULATOR

The present invention relates to a handheld piezoelectric acupuncture stimulator with a pen-like, substantially electrically insulating exterior casing, at one end of which an actuator button is mounted, while the other end is provided with a contact pin retracted from an end surface intended for contact with the skin in an acupuncture zone, said contact pin being connected with a first electrode of a piezoelectric converter, the second electrode of which is in electrical connection, on one hand, with a hand contact and is mechanically operable, on the other hand, by means of a spring-loaded impact hammer operated by the actuator button for generation of a high-voltage electric pain relieving pulse with a low energy content.

From DE-A1-40 26 820 an acupuncture stimulator of this kind is known, in which the piezoelectric converter and a comparatively long contact pin connected with its first electrode are arranged in their respective electrically insulating casings, surrounded by an electrically conductive metallic exterior casing and a likewise metallic treatment head with an end surface designed for contact with the skin, respectively. The impact hammer with accompanying actuator compression spring is accommodated in a bore in the comparatively elongate actuator button, while the return spring is mounted between recessed shoulder surfaces on the actuator button and an intermediate piece arranged around the piezoelectric converter between the actuator button and the insulating casing.

The considerable number of fairly small individual components in this known stimulator complicates its manufacture and mounting, and the design with an electrically conducting exterior casing and treatment

head entails a less satisfactory insulation of the high-voltage electrode of the piezoelectric converter and may impair the efficiency of the stimulator.

These drawbacks are remedied by the invention by a design of a stimulator of the kind defined, which is characterized in that the piezoelectric converter is mounted together with said first and second electrodes and said impact hammer with associated spring system, which comprises an actuator compression spring and a return spring, in a common electrically insulating interior casing designed for form-fit mounting in the exterior casing with said contact pin being retained with a comparatively short, protruding length at one end of the interior casing, at the other end of which a longitudinally displaceable impact hammer actuator is mounted, said actuator being mechanically connected with the actuator button, whereby the electric connection between the second electrode of the piezoelectric converter and said hand contact comprises a leaf spring contact, which projects through the interior casing and extends between said interior casing and the exterior casing for establishing contact with the hand contact, which is designed as a contact ring.

The leaf spring contact is preferably provided with a bent end portion fixed in a recess at the free edge of an end member of the exterior casing, said end member serving as a support for the contact ring. In this way it becomes possible in a simple manner by dimensioning the bent end portion of the leaf spring contact to obtain an accurate fixing of the spark distance between the end of the contact pin and the end portion of the stimulator intended for skin contact.

Owing to the fact that the handheld stimulator is designed for operation of the actuator button by the thumb, an accurate positioning of the exterior contact

ring for establishing contact with the user's forefinger may be obtained by mounting the actuator button in a top member placed in extension of the exterior casing and the contact ring and having a protruding abutment as support for the user's forefinger knuckle, when the actuator button is operated by the thumb.

The invention will now be explained in detail in the following with reference to the accompanying drawings, in which

Figs 1 and 2 show an embodiment of a piezoelectric acupuncture stimulator according to the invention in mounted condition, and an exploded view of its main components, respectively, and

Fig. 3 shows more schematically the component parts mounted in the interior casing of the stimulator.

Seen from outside, the handheld piezoelectric acupuncture stimulator comprises, as shown in Fig. 1, an electrically insulating exterior casing 1 of a suitable plastics material, for instance nylon, with a substantially conical end portion 2 in connection with a treatment head 3 designed for contact with the skin in an acupuncture point.

At the opposite end, in extension of the exterior casing 1, a likewise electrically insulating top member 4 is provided, in which an actuator button 5 is mounted. Since the stimulator is designed for operation of the actuator button by the thumb, the top member 4 is designed with a protruding abutment 6, which during use is placed in abutment against the forefinger knuckle and thereby positions a contact ring 7 placed between the top member 4 and the exterior casing 1 in engagement with the user's forefinger.

The active components of the stimulator, which will be described below with reference to Fig. 3, are according to the invention, as shown in Fig. 2, mounted

in an electrically insulating interior casing 8, from one end of which the contact pin 9 protrudes with a comparatively short length, said contact pin being adapted to transfer the pain relieving pulses produced by the stimulator by spark formation.

The interior casing 8 is designed for form-fit mounting in the exterior casing 1, the end of the contact pin 9 being somewhat retracted from the skin abutment formed by the treatment head 3 for determining a well-defined spark distance.

As likewise shown in Fig. 2, the electric connection between the earth electrode of the stimulator and the contact ring 7 is established by means of a leaf spring contact 10, which is passed through the interior casing 8 and extends between the interior casing and the exterior casing 1. The spring leaf contact 10 ends in a bent portion 11, which, for fixation of the position of the interior casing 8 in the exterior casing 1, is brought into engagement with a recess 12 at the edge of an end portion 13 of the exterior casing 1 designed to support the contact ring 7. The bent end portion 11 of the leaf spring contact 10 is retained in the recess 12 by means of a protruding cam 14 on an end member 15 of the top member 4 adapted to be inserted into the end member 13.

At the opposite end of the interior casing 8 relative to the contact pin 9, a longitudinally displaceable actuator 16 is provided for the mechanical actuation of the piezoelectric converter. In the mounted condition, the actuator 16 is actuated by the actuator button 5 via a profiled pressure member 17 mounted in the top member 4.

The active components of the stimulator, which are mounted in the interior casing 8, comprise, as shown in Fig. 3, both the piezoelectric converter 18 with a

first electrode 19 in connection with the contact pin 9 protruding from one end of the interior casing 8 and a second electrode 20 in electrical connection with a contact ring 21 provided at one end of the leaf spring contact 10, and the actuating mechanism designed for mechanical actuation of the converter 18, said mechanism comprising the longitudinally displaceable actuator 16 protruding from the opposite end of the interior casing 8 and having a guide 22 for an impact hammer 23 with a transverse blocking pin 24 and an actuator compression spring 25 and a return spring 27 positioned between the guide 22 and a holder 26 for the converter 18.

The mechanical function of the components shown in Fig. 3 is known per se and has the effect that by a longitudinal displacement of the actuator 18 in the interior casing 8 caused by operation of the actuator button 5, compression of the actuator compression spring 25 occurs at first, which spring by the release of the impact hammer 26 induced by the movement of the actuator with big force shoots the impact hammer towards the second electrode 20 of the converter 18. By the resulting instantaneous compression of the converter 18, the electrical pain relieving pulse with high voltage and comparatively low energy content is generated, for instance at 15,000 volt and 6 μA.

The pain relieving effect of the stimulator resides, as known per se, in that by the spark transfer of the pulse thus generated to an acupuncture point at the place, which is to be relieved from pain, an actuation of the body's own endorphin pain relieving system is supposed to take place.

# PATENT CLAIMS

1. A handheld piezoelectric acupuncture stimulator with a pen-like, substantially electrically insulating exterior casing (1), at one end of which an actuator button (5) is mounted, while the other end is provided with a contact pin (9) retracted from an end surface (3) intended for contact with the skin in an acupuncture zone, said contact pin being connected with a first electrode (19) of a piezoelectric converter (18), the second electrode (20) of which is in electrical connection, on one hand, with a hand contact (7) and is mechanically operable, on the other hand, by means of a spring-loaded impact hammer (23) operated by the actuator button (5) for generation of a high-voltage electric pain relieving pulse with a low energy content, characterized in that the piezoelectric converter (18) is mounted together with said first and second electrodes (19, 20) and said impact hammer (23) with associated spring system, which comprises an actuator compression spring (25) and a return spring (27), in a common electrically insulating interior casing (8) designed for form-fit mounting in the exterior casing (1) with said contact pin (9) being retained with a comparatively short, protruding length at one end of the interior casing (8), at the other end of which a longitudinally displaceable impact hammer actuator (16) is mounted, said actuator being mechanically connected with the actuator button (5), whereby the electric connection between the second electrode (20) of the piezoelectric converter (18) and said hand contact (7) comprises a leaf spring contact (10), which projects through the interior casing (8) and extends between said interior casing and the exterior casing (1) for establishing contact with the hand contact (7), which is designed as a contact ring.

2. An acupuncture stimulator according to claim 1, c h a r a c t e r i z e d in that the leaf spring contact (10) with a bent end portion (11) is fixed in a recess (12) at the free edge of an end member (13) of the exterior casing (1), said end member serving as a support for the contact ring (7).

3. An acupuncture stimulator according to claim 1 or 2, c h a r a c t e r i z e d in that the actuator button (5) is mounted in a top member (4) placed in extension of the exterior casing (1) and the contact ring (7) and having a protruding abutment (6) as support for the forefinger knuckle of the user, when the actuator button (5) is operated by the thumb.

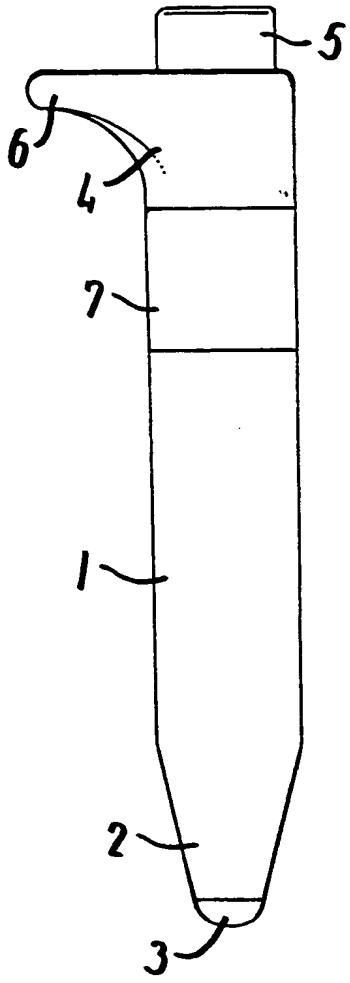



FIG.1

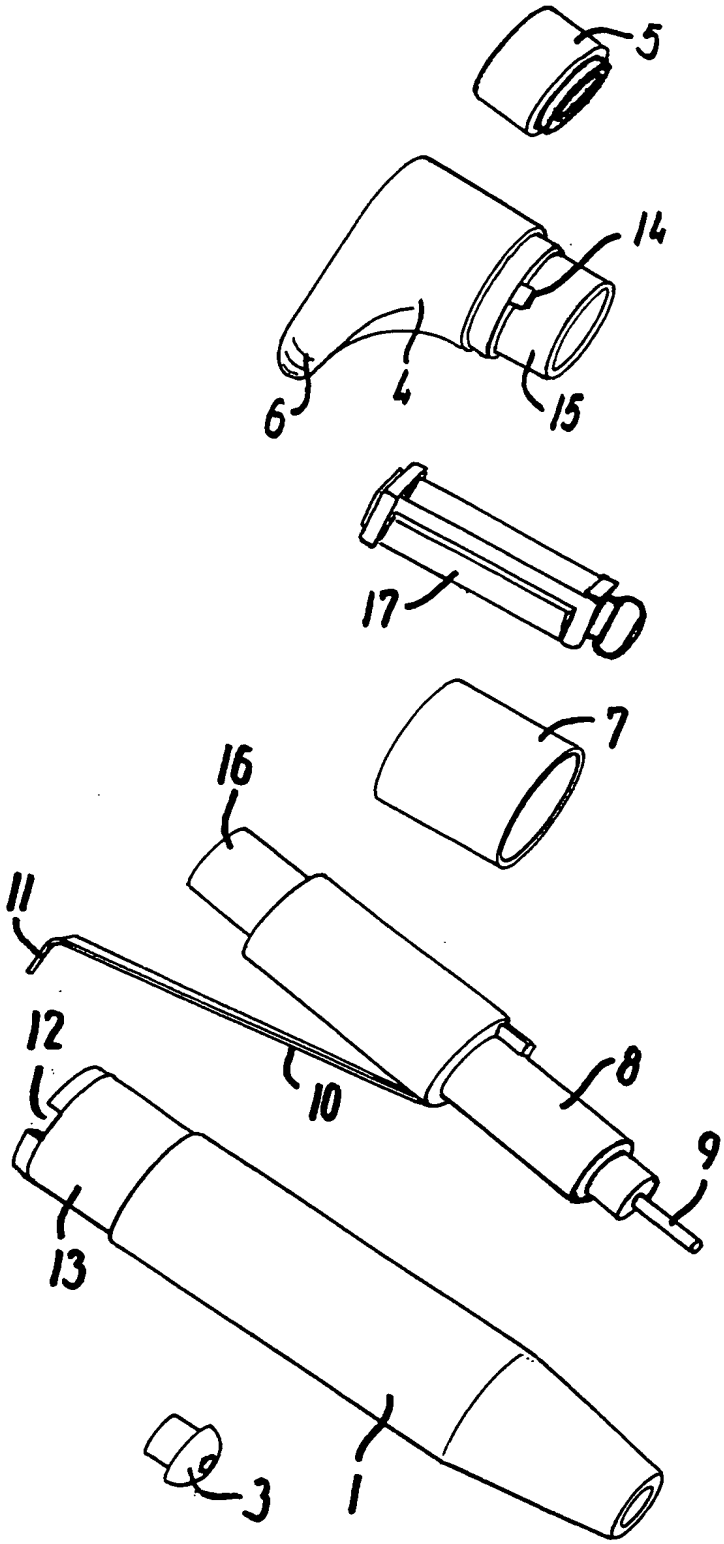



FIG.2

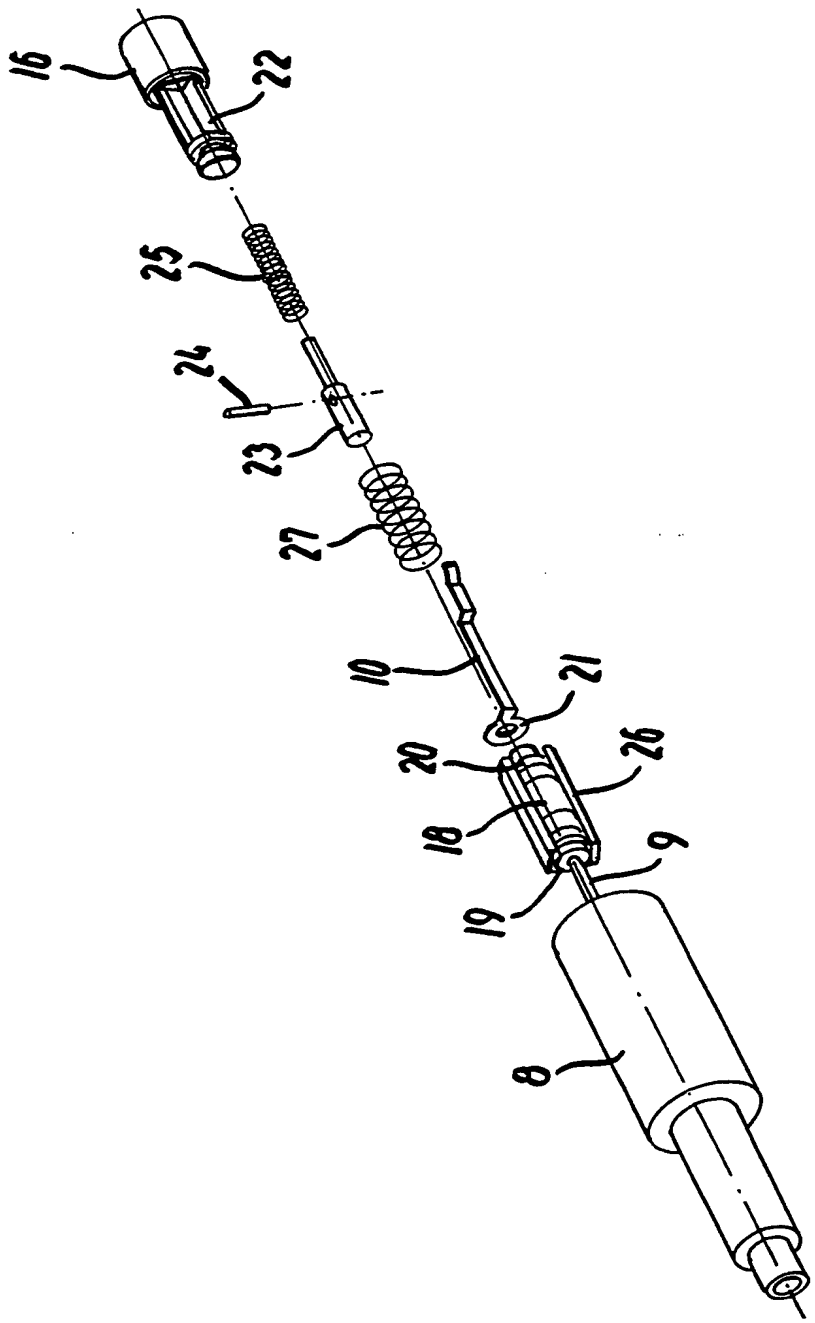



FIG. 3

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 00/00355

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A61H 39/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | GB 1448644 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.), 8 Sept 1976 (08.09.76), figures 1-3, claims 1-5 | 1-3 |
| X | DE 4026820 A1 (VEGA GRIESHABER GMBH & CO.), 27 February 1992 (27.02.92), column 2, line 65 - column 3, line 7, figures 1,2, claims 1-6 | 1 |
| A | DE 3121254 A1 (KLOSTERMANN, HORST), 16 December 1982 (16.12.82), figures 1-2b, claims 1-14 | 1-3 |

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 24 October 2000 | 26 -10- 2000 |
| Name and mailing address of the ISA/<br>Swedish Patent Office<br>Box 5055, S-102 42 STOCKHOLM<br>Facsimile No. +46 8 666 02 86 | Authorized officer<br>Agneta Änggård/Els<br>Telephone No. +46 8 782 25 00 |

Form PCT/ISA/210 (second sheet) (July 1992)

# INTERNATIONAL SEARCH REPORT

Information on patent family members

03/10/00

International application No.
PCT/DK 00/00355

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| GB 1448644 A | 08/09/76 | AR 206795 A | 23/08/76 |
| | | AU 472319 B | 20/05/76 |
| | | AU 7574374 A | 20/05/76 |
| | | DE 2423365 A | 12/06/75 |
| | | DE 2456111 A | 19/06/75 |
| | | FR 2252054 A,B | 20/06/75 |
| | | FR 2253615 A,B | 04/07/75 |
| | | GB 1444831 A | 04/08/76 |
| | | IT 1023432 B | 10/05/78 |
| | | JP 1155214 C | 15/07/83 |
| | | JP 50087469 A | 14/07/75 |
| | | JP 57048580 B | 16/10/82 |
| | | US 3941688 A | 02/03/76 |
| | | US 4040949 A | 09/08/77 |
| | | JP 1113176 C | 16/09/82 |
| | | JP 50087470 A | 14/07/75 |
| | | JP 57006454 B | 04/02/82 |
| DE 4026820 A1 | 27/02/92 | DE 9017694 U | 02/10/91 |
| DE 3121254 A1 | 16/12/82 | NONE | |